SAVICH, B.M.; MOROZOV, A.G.

Norsulfazole sodium and sulfadimezine in pasteurellosis (cholera) of poultry combined with vaccination. Veterinariia 36 no.9:34-35 S '59. (MIRA 12:12)

1. Pyatigorskaya veterinarnaya laboratoriya po bor'be s boleznyami ptits.
(Sulfathiazole) (Sulfamethazine) (Chicken cholera)

[illegible], A. [illegible].

Korezov, A. [illegible]--"Problem of the [illegible] of a Gel-dust flame." [illegible] Tech Sci, Moscow [illegible] of Chemical Machines [illegible], [illegible] 1955. Referativnyy Zhurnal--Khimiya, No 20, 1956.

SO: SUM [illegible], 22 July 1956.

66371

21.5300 SOV/120-59-5-14/46

AUTHORS: Morozov, A.G., Nekrasov, K.G. and Popov, M.I.

TITLE: A Hodoscope Fitted with Small-diameter Counters Fed from a Pulsed Source

PERIODICAL: Pribory i tekhnika eksperimenta, 1959, Nr 5, pp 64 - 68 (USSR)

ABSTRACT: Various fillings are used in the counters in order to obtain the best performance. Figure 1 shows how the efficiency P varies with $m = M/M_o$, a parameter specifying what fraction of the electrons produced by an ionizing event is collected by the cathode (m negative) or by the wire (m positive). M specifies the effect of voltages less than that required to initiate a discharge during the interval from t_1 (when the ionising event occurs) to t_2 (when the voltage is sufficient to cause a discharge). Eq (1) gives M in formal form. Similarly, M_o is the effect produced by a voltage sufficient to initiate a discharge in a counter whose

Card1/4

A Hodoscope Fitted with Small-diameter Counters Fed from a Pulsed Source

cathode has a diameter D and whose wire has a diameter d (Eq 2); k/p is the electron mobility in the gas at a pressure p. (The quantity α in Figure 1 is the mean number of electrons left behind in a length equal to the radius of the counter by the ionizing particle.) These curves are used to show, what is surely obvious, that the rise time of the supply pulse should be as short as possible.

Figure 2 shows the pulse-supply source, in which the two thyratrons are hydrogen-filled and give a current rising at 100 A/μsec; the duration of the output pulse is adjustable from 1.5 μsec upwards. The delay varies from 0.2 to 0.4 μsec. A capacitance of 1000 pF attached to the output lengthens the rise time from 3×10^{-8} sec to 5×10^{-8} sec.

Figure 3 shows some results for two counters filled with argon-isopentane; the curves were recorded with 1 500 V pulses lasting 3 μsec, and delayed by 0.3 μsec. Here, V_0

A Hodoscope Fitted with Small-diameter Counters Fed from a Pulsed Source

is the steady (clearing) voltage applied to the counters. The rise time of the pulse cannot be made much shorter, so these counters are not usable; Figure 4 shows results for counters filled with argon-methylal, used with 2 μsec 1 500 V pulses delayed by 0.7 μsec (counter diameter 9.6 mm). Here, the methylal gives 1/6 of the total gas pressure. This design is also unsuitable. Resort is made to neon, which can be used at high pressures without demanding very high voltages. Figure 5 relates to counters 7.5 mm in diameter and containing neon only at 2 atm; the efficiency (Curve 1) and false count rate (Curves 2) are shown as functions of pulse voltage. Small clearing voltages are effective. Figure 6 gives more details for these counters; the pulse voltage is 1 100 V, the pulse length is 2 μsec, the clearing voltage is shown horizontally and the delay times are, respectively, 0.7, 1.5, 2.5 and 4.5 μsec for Curves 1-4. The parameters finally chosen are -5 V clearing and the shortest delay time. (The efficiency is constant if the product of the clearing voltage and delay

A Hodoscope Fitted with Small-diameter Counters Fed from a Pulsed Source

time is constant.)
Figure 7 gives some results for the efficiency as a function of delay time at zero clearing voltage (1 is for neon, 2 is for argon). The table lists the parameters of the counters.
There are 7 figures, 1 table and 7 references, 4 of which are Soviet and 3 English or translations from English.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Nuclear Research Institute)

SUBMITTED: September 2, 1958

Card 4/4

MOROZOV, A.G., Cand Tech Sci (diss) -- "Investigation of a system for cooling the engine of a self-propelled combine". Moscow, 1960. 21 pp (Min Agric USSR, Moscow Inst of the Mechanization and Electrification of Agric), 150 copies (KL, No 12, 1960, 128)

MOROZOV, A.G.

Heat transfer in a carburetor engine. Avt.prom. no.1: 23-26 Ja '60. (MIRA 13:5)

1. Sverdlovskiy sel'skokhozyaystvennyy institut.
(Diesel engines)

S/262/62/000/002/005/017
I008/I208

AUTHOR: Morozov, A. G.

TITLE: A graphical analytical method of determining the heat transferred in an engine

PERIODICAL: Referativnyy zhurnal, otdel'nyy vypusk. 42. Silovyye ustanovki, no. 2, 1962, 51, abstract 42.2.270. "Tr Mosk. in-ta mekhaniz. i elektrifik. s.kh.", no. 12, 1960, 139-144

TEXT: A graphical-analytical method for rapid determination of the heat transferred in an engine (Q_{WH}) is proposed. From the curve of the intensity of heating of the liquid coolant as a function of time the slope of the heating curve of the engine α is determined. Assuming that the amount of heat transferred by the radiator (Q_{WO}) is known, Q_{WH} is calculated from the formula

$$Q_{WH} + Q_{WO} + \mu(c_W P_W + C_{MR} P_R + C_{MB} P_B)\mathrm{tg}\alpha$$

C_W — heat capacity of the liquid, P_W — its weight; C_{MR} — heat capacity of the radiator's body, P_R — its weight; C_{MB} — heat capacity of the cylinder block, P_B — the weight of the water cooled part of the cylinder block and its head; μ — scaling factor of the diagram. As an example, the heat transferred in the ЗИЛ-120 К (ZIL-120 K) engine, is calculated .There are 3 figures and 2 references.

[Abstracter's note: Complete translation.]

Card 1/1

MOROZOV, A.G., inzh.

Selecting ventilators for cooling systems of tractor and combine engines. Trudy MIMESKH 12:145-156 '60. (MIRA 13:9)
(Tractors--Engines--Cooling)
(Combines (Agricultural machinery))

MOROZOV, A.G.

Coincidence and anticoincidence circuits on transistors. Prib. i tekh. eksp. 9 no.3:57-61 My-Je '64 (MIRA 18:1)

1. Ob"yedinennyy institut yadernykh issledovaniy.

L 11186-67 EWT(d)/EWT(l)/EWT(m)/EWP(f) FDN/WW
ACC NR: AR6028225 SOURCE CODE: UR/0273/66/000/005/0004/0004

AUTHOR: Morozov, A. G.

TITLE: Approximate calculation of heat transfer in internal combustion engines

SOURCE: Ref. zh. Dvigateli vnutrennogo sgoraniya, Abs. 5.39.15

REF SOURCE: Tr. Sverdl. s.-kh. in-ta, no. 13, 1965, 22-27

TOPIC TAGS: internal combustion engine, heat transfer, approximation calculation

ABSTRACT: The author proposes an approximate method for calculating heat transfer in internal combustion engines. Computation is based on pressures and temperatures of characteristic points on an indicator diagram which reduces the bulk of the calculations by several times. The proposed method is more accurate since the duration and nature of combustion and expansion processes are taken into account as well as the variation in temperatures, pressures and heat transfer surface during the working cycle. [Translation of abstract]

SUB CODE: 21

Card 1/1 UDC: 621.432.016.4

ACCESSION NR: AP4041017 S/0120/64/000/003/0057/0061

AUTHOR: Morozov, A. G.

TITLE: Transistorized coincidence and anticoincidence devices

SOURCE: Pribory* i tekhnika eksperimenta, no. 3, 1964, 57-61

TOPIC TAGS: coincidence, coincidence device, double coincidence device, anticoincidence, anticoincidence device

ABSTRACT: Transistorized double-coincidence and anticoincidence circuits developed by the author are described; P411A, P410A, P416B, and P415A high-frequency (400 mc) transistors were tested in the input amplifier. The amplifier, coincidence circuit, anticoincidence circuit, and discriminator are described. The circuits were supplied by a mercury generator and their time-resolution characteristics were determined. The minimum resolution time of the coincidence circuit is 7×10^{-9} sec and that of the anticoincidence circuit is

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ACCESSION NR: AP4041017

1.3×10^{-8} sec; input sensitivity is 0.1 v. "The author wishes to thank S. M. Korenchenko, K. G. Nekrasov, and A. N. Sinayev for their valuable comments made while discussing this project." Orig. art. has: 9 figures.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Nuclear Research Institute)

SUBMITTED: 18Jun63 ENCL: 00

SUB CODE: EC, IE NO REF SOV: 001 OTHER: 002

Card 2/2

MOROZOV, A.I.

Side reactions in antibiotic therapy. Pediatriia 39 no.3:77-78 My-Je '56. (MLRA 9:9)

1. Iz kafedry fakul'tetskoy pediatrii (zav. - prof. P.A.Ponomareva) II Moskovskogo meditsinskogo instituta imeni I.V.Stalina.

(ANTIBIOTICS, inj. eff.
skin dis. in child)
(SKIN DISEASES, etiol. and pathogen.
antibiotics, in child.)

MOROZOV, A.I.

Changes in the extracellular fluid during the active phase of rheumatism in children (1st report). Pediatriia no.1:57-62 '62. (MIRA 15:1)

1. Iz kafedry pediatrii (zav. - deystvitel'nyy chlen AMN SSSR prof. G.N. Speranskiy) TSentral'nogo instituta usovershenstvovaniya vrachey i Instituta eksperimental'noy biologii i meditsiny (dir. - prof. Ye.N. Meshalkin, nauchnyy rukovoditel' - doktor meditsinskikh nauk R.L. Gamburg) Sibirskogo otdeleniya AN SSSR.
(WATER METABOLISM) (RHEUMATIC FEVER)

MATVEYEV, M.P., dotsent; VEL'TISHCHEV, Yu.Ye.; MASHKEYEV, A.K.; MOROZOV, A.I.

Study of glomerular filtration in children by means of sodium thiosulfate and endogenous creatinine. Pediatriia no.8:31-36 '62. (MIRA 15:10)

1. Iz kafedry pediatrii (zav. - deystvitel'nyy chlen AMN SSSR prof. G.N.Speranskiy) TSentral'nogo instituta usovershenstvovaniya vrachey (rektor M.D.Kovrigina).
(KIDNEYS) (CREATININE) (SODIUM THIOSULFATE)

MOROZOV, A. I.; SOLOV'YEV, L.S.

Cybernetics regulation of instabilities in a plasma. Zhur. tekh. fiz. 34, no.9:1566-1575 S '64. (MIRA 17:10)

MORZOV, A. I.

"Diagnostics and Treatment of Epithelial Tumors of the Urinary Bladder." Khar'kov State Medical Inst, Khar'kov, 1955. (Dissertation for the Degree of Candidate in Medical Sciences)

SO: M-955, 16 Feb 56

MOROZOV, A.I.

Repair of large defects in the femoral diaphysis by lyophilized tubular homografts under experimental conditions. Khirurgiia 36 no.11:34-39 N '60. (MIRA 13:12)

1. Iz II khirurgicheskoy kliniki (zav. - prof. Ya.G. Dubrov) Moskovskogo oblastnogo nauchno-issledovatel'skogo instituta.
(BONE GRAFTING) (FEMUR--SURGERY)

MOROZOV, A.I., dotsent

Closed trauma of the large vein. Vest.khir. no.5:111-112 '62. (MIRA 15:11)

1. Iz kafedry khirurgii (zav. - prof. I.F. Kaplan) Zaporozhskogo instituta usovershenstvovaniya vrachey im. M. Gor'kogo (dir. - dotsent V.T. Karpukhin).
(VEINS--WOUNDS AND INJURIES)

MOROZOV, A. I.

Experiment on vitamin content of meals in the sanatoria of Sochi-Matsest. A. I. Morozov and V. S. Lioznova. *Voprosy Pitaniya* 15, No. 1, 66–9(1956).—The so-called mg./hr. excretion of ascorbic acid (I) in urine on an empty stomach in the morning is an index of the vitamin C status of the organism and is recommended for use in sanatoria and in clinics. The times of the first and the second urinations in the morning are recorded, the time interval noticed, and the vol. of the urine gained at the second time measured. The expt. conducted on 130 patients revealed that in 75 men the mg./hr. excretion of I was 0.7–1, while in the remaining 55 men it was below this value. After taking a medical diet contg. 70–80 mg. I for 20 days a 0.7–1 mg./hr. excretion of I was found in 117 patients. E. Wierbicki

Med 2

AUTHORS Alekseyeva, V.G., Kalashnikov, S.G., Kalnach, L.P., 57-9-2/40
Karpova, I.V., Morozov, A.I.,

TITLE The Influence of the Elements of the III. and V. Groups on the Recombination Velocity of Electrons and Holes in Germanium. (Vliyaniye elementov III i V grupp na skorost' rekombinatsii elektronov i dyrok v germanii - Russian)

PERIODICAL Zhurnal Tekhn. Fiz.,1957, Vol 27, Nr 9, pp 1931-1939,(U.S.S.R.)

ABSTRACT The influence exercised by bismuth, antimony, thallium, and gallium on the recombination velocity of electrons and holes in germanium is investigated. It is shown that alloying with bismuth and thallium accelerates recombination considerably, whereas antimony and gallium are considerably less active. It is assumed that the penetrating atoms of the alloy elements are the recombination center and determine the order of magnitude of the capture cross section in the case of bismuth atoms for the holes and in the case of thallium for the electrons. It is shown that they are of the order of $1o^{-15}$ cm^2. The order of the upper cross section limit for antimony and thallium is shown to be $\sim 1o^{-18}$ cm^2. The relation between the efficacy of recombination centers created by the various elements and the values of their distribution coefficients (atomic radii) is demonstrated. On the strength of these facts it is assumed that the lattice deformations occuring with penetration of the atoms of the alloying elements play an important part in recombination.

Card 1/2

ZHDANOVA, N.G.; KALASHNIKOV, S.G.; MOROZOV, A.I.

Effect of temperature on the rate of recombination of electrons and holes on copper atoms in germanium. Fiz. tver. tela 1 no.4: 535-544 '59. (MIRA 12:6)

1. Institut radiotekhniki i elektroniki AN SSSR, Moskva.
(Copper) (Germanium)

24.7600

~~9 (3)~~

67318

AUTHORS: Kalashnikov, S. G., Morozov, A. I. SOV/181-1-8-23/32

TITLE: Temperature Dependence of the Electron Capture Coefficient in the Case of the Medium Level of Copper in Germanium

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 8, pp 1294 - 1296 (USSR)

ABSTRACT: The authors investigated the temperature dependence of the capture coefficient of level C_{n2} by measuring the temperature dependence of electron lifetime τ in sufficiently alloyed p-type germanium samples corresponding to the flat section on the concentration dependence of lifetime. In this case (i.e., with small equilibrium perturbation, low trap concentration $\tau = (NC_{n2})^{-1}$ holds, N denoting copper atom concentration; C_{n2} temperature dependence is ascertained directly from the temperature dependence of τ. For this purpose 10 germanium crystals (hole concentration between 3.10^{14} and 1.10^{16} cm^{-3}) alloyed with gallium and boron were investigated. After copper injection lifetime decreased to about 1/10 to 1/20 of its original value; it was measured in a cryostat. Electron lifetime was

Card 1/3

Temperature Dependence of the Electron Capture Coefficient in the Case of the Medium Level of Copper in Germanium

determined by simultaneous measurement of the photo-electromagnetic effect and photoconductivity as well as by the method of steady photoconductivity. In the latter case the temperature dependence of the surface recombination rate was also measured in order to estimate the respective corrections. The typical lifetime-versus-temperature curves plotted in a graph show that the capture coefficient C_{n2} slightly decreases with decreasing temperature. This result does not agree with those of F. Baum et al. (Ref 4). The temperature dependence determined from the curves of the photomagnetic effect can be described by the relation $S_{n2} \sim T^{-2}$. In all samples the limit of lifetime has been attained already at room temperature. Hence, the recombination level is probably at least 0.32 ev apart from the valency band. The absolute value of the capture coefficient at 300°K was $C_{n2} = 2.10^{-10}$ cm^{3}sec^{-1} with a mean spread of ± 15%. To this value corresponds the capture cross section $S_{n2} = 1.5.10^{-17}$ cm^2.

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67318

Temperature Dependence of the Electron Capture Coefficient SOV/181-1-8-23/32
in the Case of the Medium Level of Copper in Germanium

The coefficient C_{n2} corresponds to electron capture on a singly negative copper ion. In the case of a single-charged ion in germanium the Coulomb field is insufficient for a strong diminution of C_{n2} when temperature drops. This might be explained by the tunnel effect. There are 1 figure and 11 references, 5 of which are Soviet.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moskva (Institute of Radio Engineering and Electronics of the AS USSR, Moscow)

SUBMITTED: April 18, 1959

Card 3/3

81951
S/181/60/002/04/10/034
B002/B063

24.7700

AUTHOR: Morozov, A. I.

TITLE: Anisotropy of Surface Breakdown in Germanium Within the Region of Strong Fields

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 4, pp. 620-623

TEXT: The author studied the phenomena effected on the surface of p-type or n-type germanium by current pulses from a point contact. The point contact emitted 30-a pulses of a duration of 10 - 1,000 microseconds. Orientated channels ~100 μ wide, 10 - 100 μ deep, and up to 4 mm long were produced by the discharge, and temper colors appeared on the edges. However, such channels were produced only if the point was fed from a positive pulse, irrespective of the type of crystal. The author examined the faces (110) and (111) of crystals which had been grown in the directions [111] and [110] (Figs. 1 and 2). The angles formed by the channels depended on the position of the face examined to the direction in which the crystal was grown. The author thanks S. G. Kalashnikov for his discussion, and V. G. Alekseyeva for having supplied the germanium specimens. There are

Card 1/2

81951
S/181/60/002/04/10/034
B002/B063

Anisotropy of Surface Breakdown in Germanium Within the Region of Strong Fields

2 figures and 9 references: 2 Soviet, 3 American, 2 German, and 2 Japanese.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR, Moskva (Institute of Radio Engineering and Electronics of the AS USSR, Moscow)

SUBMITTED: November 3, 1959

Card 2/2

S/181/60/002/011/022/042
B006/B056

9,4160 (3201,1003,1137)

AUTHORS: Kalashnikov, S. G. and Morozov, A. I.

TITLE: Investigation of the Phenomenon of Adhesion on Copper Atoms in Germanium

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 11, pp. 2813-2820

TEXT: The authors give a report on adhesion effects in copper-doped n-type germanium, which were studied by the use of steady methods. The photoconductivity, the photomagnetic effect, and its compensation were investigated, and the diffusion lengths were directly measured. The authors endeavored to estimate the contribution of various factors to the production of adhesion in n-type germanium. It was found that adhesion is mainly due to trivalent copper ions forming three acceptor levels in germanium. These copper ions have very different trapping cross sections for holes and electrons. The method applied is theoretically described in the introduction, and in the following some experimental data are given. The specimens which were no less than 20-50 diffusion lengths wide and no less than 4 diffusion lengths thick, were exposed to white light ($\nu > 72$ cps); the

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Investigation of the Phenomenon of Adhesion on Copper Atoms in Germanium

S/181/60/002/011/022/042
B006/B056

contact region was not exposed. 15 crystals alloyed with antimony or phosphorus and having electron concentrations of $6 \cdot 10^{14}$ - $4 \cdot 10^{16}$ cm^{-3} were examined. The copper was diffused in at 520 - 650°C. The copper concentration was determined by measuring the Hall constant. The magnetic field was chosen to be smaller than 3000 gauss, in order that $(\mu_{(n,p)}B/c)^2 \ll 1$ remained (μ - mobility; $c = n_o/p_o$). The characteristic times were determined from the photomagnetic effect (τ_{PEM}), the photoconductivity (τ_{PC}), and the compensation of both effects (τ_c), and their interrelations with the carrier lifetimes τ_n and τ_p were studied. Theoretically, $\tau_c = \tau_{PC}^2/\tau_{PEM}$; $\tau_{PEM} \cong \tau_p$; $\tau_{PC} = k\tau_p$; $\tau_c = k^2\tau_p$; and $k = 1 + \chi$. Fig. 1 shows $\tau = f(1/T)$; the curves may be divided into three sections: into a high-temperature section where $\chi < 1$ and $\tau_c \sim \tau_p$. In this section adhesion is low, and the lifetime decreases with decreasing temperature. In the section of medium temperatures $\chi > 1$, $f < 1$, $\tau_c > \tau_p$; τ_c increases with decreasing temperature. In the low-temperature section, $\chi > 1$ and $f \cong 1$ ($f = n_o/(n_o+n_1)$).

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Investigation of the Phenomenon of Adhesion on Copper Atoms in Germanium

S/181/60/002/011/022/042
B006/B056

Fig 2 shows τ_{PC} and τ_{PEM} as functions of ligh intensity for the electron equilibrium concentration $n_o = 5 \cdot 10^{14}$ cm^{-3} and the center concentration $N = 8 \cdot 10^{13}$cm^{-3}. Whereas τ_{PEM} and τ_{PC} at 300°K form parallel, adjacent, horizontal straight lines, the lines representing these two quantities at 100°K differ in their angle of inclination, position, and tendency. Fig. 3 shows the adhesion factor as a function of light intensity; k was determined by a simultaneous measurement of τ_c and τ_{PEM}. Fig. 4 shows the effect of exposure on τ_c and τ_{PEM}, and Fig. 5 shows $k = f(1/T)$ for two low-impedance specimens. The investigations led to the conclusion that copper atoms in n-type germanium cause both adhesion and recombination. Consequently, no distinction can be made between recombination and adhesion centers. The ratio between the trapping cross sections for electrons and holes for the top (third) Cu level was determined to be $\geq 10^3$ at room temperature, and was found to increase with decreasing temperature. The occurrence of adhesion at increased temperature is related not only to the temperature dependence of the trapping cross sections, but also to the increase of ion concentration with high states of charge. There

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Investigation of the Phenomenon of Adhesion on Copper Atoms in Germanium

S/181/60/002/011/022/042
B006/B056

are 5 figures and 15 references: 3 Soviet and 12 US.

ASSOCIATION: Institut radiotekhniki i elektroniki AN SSSR Moskva (Institute of Radio Engineering and Electronics of the AS USSR, Moscow)

SUBMITTED: July 5, 1960

Card 4/4

9.4177 (1035,1051)
26.2421

/90
81.61/003/011/033/056
B125138

AUTHORS: Morozov, A. I., and Kalashnikov, S. G.

TITLE: Adhesion phenomena in zinc-containing germanium

PERIODICAL: Fizika tverdogo tela, v. 3, no. 11, 1961, 3473-3479

TEXT: The authors investigate photomagnetic effect and photoconductivity in n-type germanium by comparing the lives of carriers as determined from photoelectromagnetic effect (τ_{PEM}), from photoconductivity (τ_{PC}) and from the compensation of photoelectromagnetic and photoconductivity effects under stationary conditions. The same apparatus is used as that described in a previous paper (S. G. Kalashnikov, A. I. Morozov, FTT, 2, 1813, 1960). By using a cryostat with evacuation makes it possible to work with solid nitrogen in some cases. The measurements were carried out under the following conditions: 1) Hall angles low. Length of the irradiated part of the sample containing many diffusion lengths; regions in around the contacts shaded for some diffusion lengths; width of sample much greater than its depth (one-dimensional problem). Pairs generated on the surface. The theory of photoconductivity and photoelectromagnetic effects

Card 1/5 3

Adhesion phenomena in zinc-containing

are applied to phenomena with linear recombination. In Fig. 1 the typical temperature dependence of τ_{PEM}, τ_{PC} and τ_p is shown for two samples. These three periods are equal at room temperature, but at lower temperatures they are different because of adhesion. The curves for these temperatures have the same character as the curves for copper. Unlike copper, in the case of zinc τ_p is not inversely proportional to the concentration of zinc. Recombination must therefore pass through other centers of whose origin cannot be verified. Fig. 2 shows typical curves for the temperature dependence of the adhesion coefficient. The same values of k are found from the two relations $\tau_{PC} = k\tau_p$ and $\tau_e = k'\tau_p$ (2), where τ_p denotes the life-time of the minority carriers. k is equal to one at room temperature, but it increases at lower temperatures and reaches values of 10^2-10^3 at liquid-nitrogen temperatures. The temperature region where $k \sim 1$ becomes narrower with increasing zinc concentration and the absolute values of k increase. Fig. 3 shows the influence of light intensity on τ_{PC} and on the diffusion length L_o (photoelectromagnetic effect) for one of the

Card 2/6

Adhesion phenomena in zinc-containing...

SOV/61/003/011/033/056
B138

samples. The curves of Figs. 1 and 2 ... the corresponding theoretical curves. The adhesion factor ...

$$\kappa = 1 + (b/(1+b))(N/p_1) \quad (6)$$

and does not depend on the ratio of the ... coefficients. The results of the present work show that ... in germanium are an interesting example of good centers of ... Unlike copper, zinc atoms do not participate in recombinati... strong adhesion is caused by the great difference in the capture ... sections $S_p^=$ and S_n^- of the holes and electrons, respectively. N. ... is thanked for submitting the germanium crystals. There ... figures and 10 references: 3 Soviet and 7 non-Soviet. The three most ... references to English-language publications read as follows: ... Phys. Rev., 116, 793, 1959; M. Lax, Phys. Rev., 119, 1502 (19...). ... Hall, Proc IEE, 106, Suppl. no. 17, 923, 1959.

ASSOCIATION: Institut radiotekhniki i ... AN SSSR Moskva
(Institute of Radio Engineers and Electronics of the AS USSR Moscow)

SUBMITTED: June 19, 1961

Card 3/6

S/058/63/000/002/044/070
A062/A101

AUTHOR: Morozov, A. I.

TITLE: Investigation of the anisotropy of a surface breakdown in germanium

PERIODICAL: Referativnyy zhurnal, Fizika, no. 2, 1963, 69 - 70, abstract 2E465 ("Tr. Soveshchaniya po udarn. ionizatsii i tunnel'n. effektu v poluprovodnikakh, 1961". Baku, AN AzerbSSR, 1962, 97 - 102)

TEXT: Results are obtained which give evidence of the anisotropy of surface breakdown in germanium. The crystallographic directivity of the discharge is determined by the polarity of the pulse and does not depend on the type of conductivity of the sample. The discharge directions for a negative and positive pulse polarity are different. A similar phenomenon takes place at the breakdown in the bulk of dielectrics (RZh Fiz, 1959, no. 6, 13312; 1961, 2E17"). It is shown that by application of a coaxial compression of the sample, by action of a magnetic field and by changing the configuration of the electric field in the sample, it is possible to intensify certain directions of breakdown. It is established that the pattern of the surface breakdown does not change in the temperature

Card 1/2

Investigation of the anis.tropy of...

range 100 - 300°K and does not depend on the number of dislocations in the sample.
See RZh Fiz, 1960, no. 10, 27047.

[Abstracter's note: Complete translation]

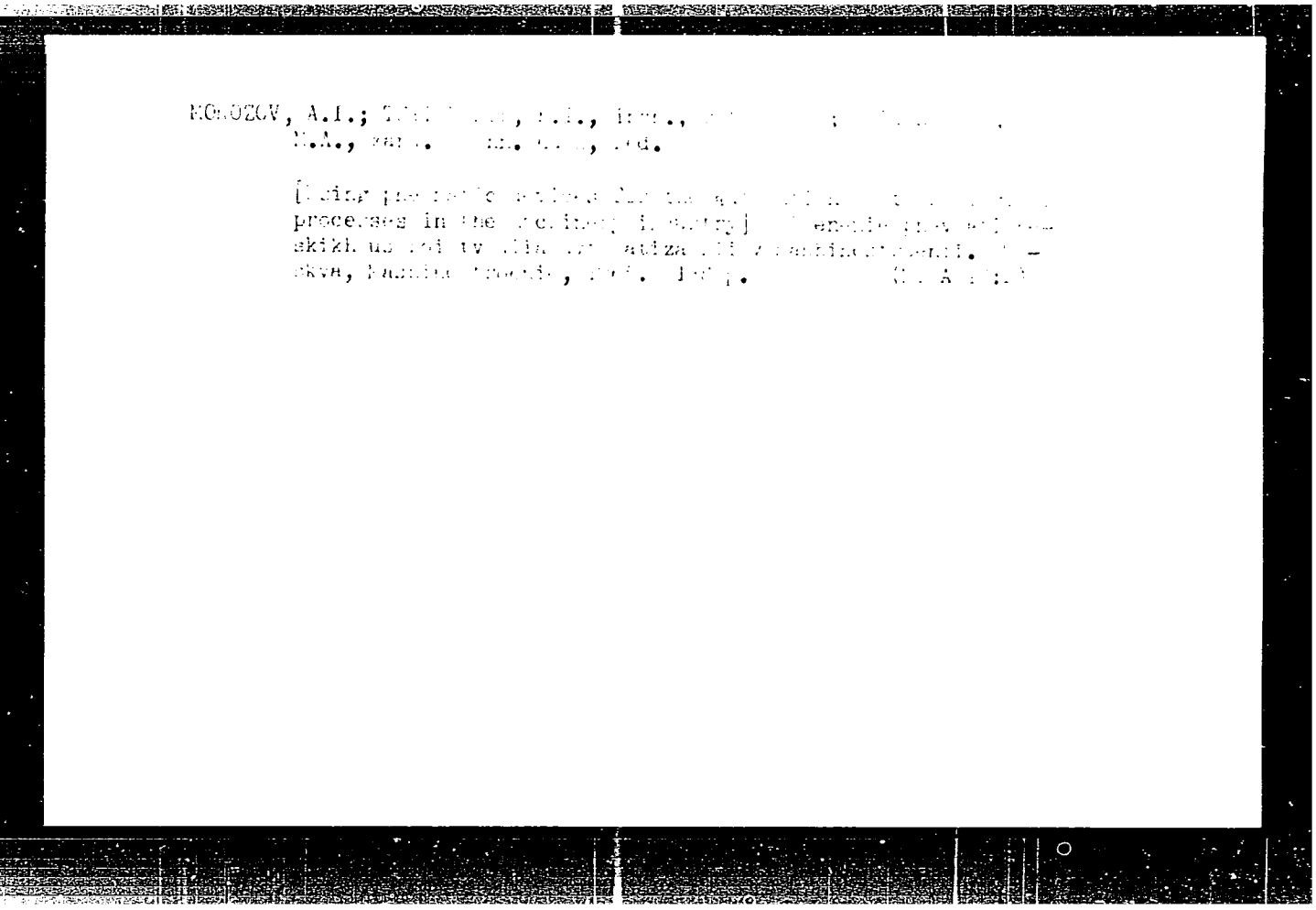
Card 2/2

MOROZOV, A. I.

"Effects of Recombination ~~nfx~~ and Attachment of Electrons and Vacancies in Germanium."

Dissertation defended in the Institute of Radioengineering and Electronics for the academic degree of Candidate of Physicomathematical Sciences

Vestnik Akad. Nauk, No. 4, 1963, pp. 119-145



KOROZOV, A.I.; [illegible], r.i., [illegible]; [illegible] N.A., [illegible], red.

[Using [illegible] processes in the [illegible]] [illegible] skikh us[illegible]tv [illegible]. [illegible] skva, Nauchno [illegible], [illegible]. [illegible]

L 23023-66 EWT(l)/EWT(m)/EPF(n)-2/T/EWP(t)/ETC(m)-6 IJP(c) JD/WW

ACC NR: AP6009665 SOURCE CODE: UR/0181/66/008/003/0805/0808

AUTHORS: Morozov, A. I.; Kobyakov, I. B.; Kisil', I. I.

ORG: All-Union Scientific-Research Institute of Single Crystals, Khar'kov (Vsesoyuznyy nauchno-issledovatel'skiy institut monokristallov)

TITLE: Acoustoelectric interaction in hexagonal zinc sulfide

SOURCE: Fizika tverdogo tela, v. 8, no. 3, 1966, 805-808

TOPIC TAGS: zinc sulfide, semiconductor carrier, semiconductor conductivity, piezoelectric property, acoustic speed, dielectric constant, photoeffect, electron mobility

ABSTRACT: For the purpose of determining the interaction between sound waves and free carriers in semiconductors of the $A^{II}B^{VI}$ type, which have piezoelectric properties, the authors determined the coefficients of electromechanical coupling (K_{33} and K_{15}), the speed of sound of the longitudinal waves along the optical axis, and the speed of the shear waves in a direction perpendicular to the optical axis)

Card 1/3

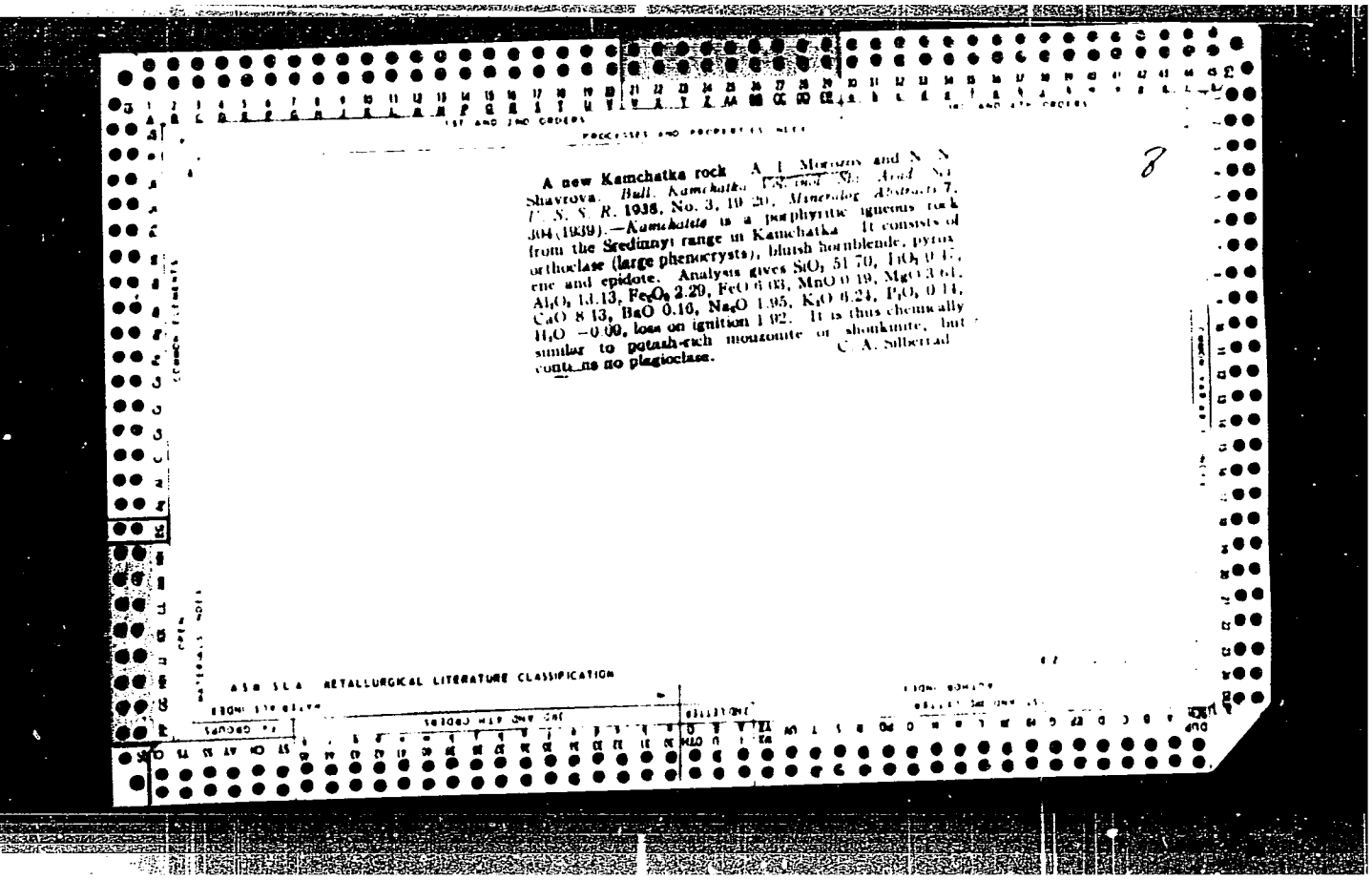
in single crystals of α-ZnS grown from the melt in an argon atmosphere under pressure. They investigated the electron absorption and the acoustoelectric effect as functions of the intensity and spectral composition of illumination applied to the crystal. The dark damping of the longitudinal waves along the c axis and of the shear waves in a direction perpendicular to it were found to be 0.35 db/cm and 0.50 db/cm, respectively. The values obtained for K_{33}, K_{15} were 0.127 and 0.054 respectively, for d_{33} and d_{15} the values were 9.7 and -8.4 x 10^{-8} cm/statvolt. The dielectric constant was 8.7 in both directions. The longitudinal and transverse velocities by both the pulsed and the resonance method were 5.92 x 10^{-5} and 2.68 (2.67) x 10^{-5} cm/sec, respectively. The electron absorption was almost linear with the applied illumination. With changing illumination intensity, the average acoustoelectric field exhibits a plateau, which is in satisfactory agreement with the theory. The acoustoelectric voltage had a variation similar to the electron absorption. The investigated α-ZnS crystals were found to have n-type conductivity, with approximate electron mobility 80 cm^2/sec-v. The results are in agreement

with the theory of electron-phonon interaction in piezoelectric crystals. The authors thank S. G. Kalashnikov and V. A. Koptsik for interest in the work and M. Z. Zemlyanitsin for help with the measurements. Orig. art. has: 3 figures, 3 formulas, and 2 tables.

SUB CODE: 20/ SUBM DATE: 26Jul65/ ORIG. REF: 003/ OTH REF: 004

ARTYUSHKOV, Ye.V. (Moskva) [illegible]

Longitudinal stability of the one-dimensional flow of a conducting gas. Teplofiz. vys. temp. [illegible] no.4 [illegible]
Ag '64. [illegible]



A new Kamchatka rock. A. I. Moiseev and N. N. Shavrova. *Bull. Kamchatka Exp. Inst. Appl. Sci. U. S. S. R.* 1938, No. 3, 19–20; *Mineralog. Abstracts* 7, 304 (1939).—*Kamchatite* is a porphyritic igneous rock from the Sredinnyi range in Kamchatka. It consists of orthoclase (large phenocrysts), bluish hornblende, pyroxene and epidote. Analysis gives SiO_2 51.70, TiO_2 0.47, Al_2O_3 14.13, Fe_2O_3 2.29, FeO 6.03, MnO 0.19, MgO 3.61, CaO 8.13, BaO 0.16, Na_2O 1.95, K_2O 0.24, P_2O_5 0.14, H_2O −0.00, loss on ignition 1.02. It is thus chemically similar to potash-rich monzonite or shonkinite, but contains no plagioclase.

C. A. Silberrad

MOROZOV, A. I.

PA 35/49T70

USSR/Minerals
Aluminum Silicates
Calcium Silicates

Aug 48

"Vesuvianite From West Keyv (on the Kola Peninsula)," A. A. Chumakov, A. I. Morozov, I. V. Ginzburg, Kola Sci Res Base, Acad Sci USSR, 3 pp

"Dok Ak Nauk SSSR" Vol LXI, No 6

Discusses crystal structure of vesuvianite (wiluite) found by authors in 1947 in West Keyv. Tables contract chemical composition of the vesuvianite found that of wiluite as described by N. Koksharov. Submitted by Acad D. S. Belyankin, 25 Jun 48.

35/49T70

MOROZOV, A. I.

PA 9/49T56

USSR/Geology
Volcanology

Oct 48

"The Ksudach Crater," A. I. Morozov, 2 pp

"Priroda" No 10

Volcano, on southern end of Kamchatka, was dormant and crater contained a lake of approx .5-km diameter. Crater ridge was 900 meters above sea level and 150 meters above surface of crater lake. In 1907 volcano erupted and today surrounding area is still devoid of life.

9/49T56

VLADAVETS, V.I.; MOROZOV, A.I.; TROITSKIY, V.D.

Malyy Semyachik Sopka. Biul.Vulk.sta. no.15:19-27 '48. (MLRA 9:11)
(Malyy Semyachik Sopka)

MOROZOV, A.E.

USSR/Miscellaneous - Archaeology

Card 1/1 : Pub. 86 - 26/40

Authors : Morozov, A. I.

Title : Traces of ancient settlements

Periodical : Priroda 43/4, 110-111, Apr 1954

Abstract : An account is given of observations and measurements made of certain ditches and embankments found on the Kola peninsula, which are traced to the work of human beings. One Russian reference (1951).

Institution : .....

Submitted : .....

KRUCHININ, N.V., inzh.; MOROZOV, A.I., inzh.

Constructing flood dams in the Ala-Tau Mountains. Gidr. stroi. 30 no.10:19-21 O '60. (MIRA 13:10)
(Trans-Ili Ala-Tau--Flood dams and reservoirs)

MOROZOV, A.I., kand. geol.-miner. nauk, red. [illegible].

[illegible]
mapping [illegible]
geologicheskom kartirovanii. [illegible]

[illegible]

"Prophylaxis of Radiation Injuries to Eyes After Radium Therapy," by A. I. Morozov and A. Z. Nagrodskaya, Radiology Department (head, Prof A. V. Kozlova), Central Scientific Research Institute of Roentgenology and Radiology imeni V. M. Molotov (director, Docent I. G. Lagunova), Vestnik Rentgenologii i Radiologii, Vol 31, No 4, Jul/Aug 56, pp 48 - 51

A compound has been prepared which contains hyaluronic acid and hyaluronic-protein complexes, and it is manufactured from the vitreous body and the crystalline lens of the bovine eyeball. This preparation has a definite protective action on eyes from the effects of ionizing radiation.

MOROZOV, A.I.

Surgical treatment of soft tissue wounds in radiation sickness; experimental study. Vest.rent. i rad. 33 no.2:86-87 Mr-Ap '58. (MIRA 11:6)

1. Iz radiologicheskogo otdela (zav. - prof. A.V.Kozlova) Nauchno-issledovatel'skogo instituta rentgenologii i radiologii (dir. - dotsent I.G.Lagunova) Ministerstva zdravookhraneniya RSFSR.

(RADIATIONS, inj. eff.
radiation sickness, eff. on healing of soft tissue wds. in rabbits (Rus))
(WOUNDS AND INJURIES, exper.
eff. of radiation sickness on healing of soft tissue wds. in rabbits (Rus))

MOROZOV, A. I. Cand Med Sci -- (diss) "Surgical treatment of wounds of soft tissues in ~~cases of~~ radiation sickness (Experimental study)." Mos, 1959. 19 pp (State Sci Res X-ray and Radiological Inst of the Min of Health RSFSR), 200 copies (KL, 41-59, 106)

MOROZOV, A.I.

L 16473-65 EWG(j)/EWT(m)/EPF(c)/EPF(n)-2/EPR/EWP(t)/EWP(b) Pr-4/Ps-4/Pu-4
IJP(c)/RPL/Pa-4/EEC(gs)/AEDC(a)/ASD(a)-5/ESD(p)-3/AFETR/APTC(a) JD/WW/JW

ACCESSION NR AM4049552 BOOK EXPLOITATION S/ 871

Yepifanova, V. I. (Candidate of Technical Sciences); Akhel'rod, L. S. (Doctor of Technical Sciences); Gorokhov, V. S. (Engineer); Dy'khno N. M. (Candidate of Chemical Sciences); Cherny'shev, B. A. (Engineer); Grushevskiy, V. M. (Engineer); Antipenkov, V. M. (Engineer); Gil'man, I. I. (Engineer); Miroslavskaya, YU. A. (Engineer); Sergeyev, S. I. (Candidate of Technical Sciences); Denishchuk, B. V. (Engineer); Kaganer, M. G. (Candidate of Technical Sciences); Vasyunina, G. V. (Candidate of Technical Sciences); Glebova, L. I. (Candidate of Technical Sciences); Denisenko, G. F. (Candidate of Technical Sciences); Katina, N. F. (Candidate of Technical Sciences); Morozov, A. I. (Candidate of Technical Sciences); Martyushov, B. I. (Engineer)

Purifying air by deep cooling; technology and apparatus, in two volumes. V. 2: Industrial plants, machinery and accessory equipment (Razdeleniye vozdukha metodom glubokogo okhlazhdeniya; tekhnologiya i oborudovaniye, v dvukh tomakh. t. 2: Promy'shlenny'ye ustanovki, mashinnoye i vspomogatel'noye oborudovaniye), Moscow, Izd-vo "Mashinostroyeniye", 1964, 591 p. illus., biblio., index. Errata slip inserted. 3,000 copies printed.

TOPIC TAGS: oxygen generation, argon, crypton, neon, xenon, centrifugal

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ACCESSION NR AM4049552

compressor, pump, liquid oxygen, liquid nitrogen, air purification

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SUB CODE:GC SUBMITTED: 08Feb64 NR REF SOV: 060

OTHER: 029

Card 3/3

MOROZOV, A. I., Cand Agr Sci -- (diss) "An Experiment in Accelerated Production of Low-yield Strongly Podzolized Turfy-gley Soil." Minsk, 1957. 19 pp. (Belorussian Sci Res Inst of Agr, Acad Agr Sci), 100 copies. (KL, 7-58, 111)

PHASE I BOOK EXPLOITATION SOV/5349

Kompleksnaya mekhanizatsiya i avtomatizatsiya proizvodstva; iz opyta zavodov Penzenskogo sovnarkhoza (Overall Industrial Mechanization and Automation; From Experience of Factories Under the Penza Council of the National Economy) [Penza] Penzenskoye knizhnoye izd-vo, 1960. 250 p. Errata slip inserted. 2,000 copies printed.

Ed.: V. Tsar'kov; Tech. Ed.: Ye. Voronkova.

PURPOSE: This collection of articles is intended for the general reader interested in the mechanization and automation of machine-tool production

COVERAGE: The efforts of industrial workers of the Penza district to fulfill ahead of time the objectives set forth in the Seven Year Plan are discussed in these 11 articles. The need for complete automation in the production of machine tools and instruments is strongly emphasized. No personalities are mentioned. There are no references.

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HIGH-EFFICIENCY PROCESS EQUIPMENT

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VK/rwm/map
8-11-60

Morozov, A.I.

117-58-6-2/36

AUTHORS: Bespalov, K.I., Morozov, A.I. Candidates of Technical Sciences

TITLE: Automating the Counterboring of Links of the Roller and Bush Chain (Avtomatizatsiya zenkerovaniya zven'yev roliko-vtuloch-noy tsepi)

PERIODICAL: Mashinostroitel', 1958, Nr 6, pp 4-5 (USSR)

ABSTRACT: Workers of the chair "Technology of Machinebuilding" at the L'vovskiy politekhnicheskiy institut (L'vov Polytechnical Institute) transformed the vertical boring machine model 2118 into a semi-automatic device for the counterboring of openings in tempered bushes of combine roller and bush chains. The semi-automatic device (Figure 1) consists of the tool holder and the turning device. The cam plate (Figure 2) of the automatic feeding device is rigidly connected with the worm gear of the gear box. If counterbores with plates of hard VK8 alloy are used, the cutting speed on the machine may reach 50 mm/min, the feeding - 0.2 mm/revolution, and the turning speed of the bit spindles - 1,800 rpm. The operation cycle lasts 6 sec. The method of fastening the counterbores is shown in figure 3. The machine is fitted with a blocking system

Card 1/2

117-58-6-2/36

Automating the Counterboring of Linke of the Roller and Bush Chain which protects the tools from breakage, etc. There are 3 figures.

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Card 2/2 1. Machining-Technique

21350
S/118/60/000/011/003/014
A161/A133

9.2300 (1154, 1161, 1164)

AUTHOR: Morozov, A.I., Candidate of Technical Sciences

TITLE: Selecting an automatic line setup for assembling printed radio apparatus units

PERIODICAL: Mekhanizatsiya i avtomatizatsiya proizvodstva, no. 11, 1960, 7-10

TEXT: General line setup principles are discussed after an analysis of the Soviet and foreign practice and with reference to a new method of calculating the profitability of setups. The method has been worked out from data of the ENIMS, Eksperimental'nyy nauchno-issledovatel'skiy institut metallorezhushchikh stankov (Experimental Scientific Research Institute of Metal-Cutting Machine Tools) obtained in a study of working lines. It had been stated in the study that the organization of automatic lines for assembling printed units is profitable for 5 to 64 parts on a printed plate, i.e. 5-64 assembling heads in the line working at 100% load; from 5 down the capital investment exceeds the economy on wages, and above 64 the line becomes unprofitable because of the work rhythm. The most profitable lines

Card 1/5

are with 20-25 heads. The transportation methods between the work positions on a satellite or directly in guides in the line are discussed and the step conveyers used by foreign companies in their lines are mentioned and illustrated (conveyers of "Silvania", "Admiral", General Electric Co.) The author comes to the conclusion that the best combination is with three line sections - the head, intermediate, and end section. The head and end sections must include the conveyer drive elements, the fixing devices, control, and assembling heads. The head section must also include a magazine for loading the printed plates on the line. The section length is 700 ÷ 800 mm. In designing, the number of sections in the line and their length must be determined by graphical analysis, and then the space between the printed plates, considering the most unfavourable position of heads in relation to plates (Fig.3). As can be seen from fig.3, the maximum space between two plates on the line

$$S = \ell_{max} + A_2 + B_2 + \Delta_{min} - a_1 - a_2 ,$$

Selecting an automatic line setup ...

where ℓ_{max} is the maximum plate length; A_2 and B_2 - the distances from the lateral surface of the heads to the axis of the part being installed; Δ_{min} - the minimum permissible space for the given head design; a_1 and a_2 - the space from the plate edge to the hole for the leads of the end part. The dimension calculated by the formula will be the step in the line, and it must be as short as possible. Next, the length of the line is found by the use of the diagram (Fig.4). The diagram includes the loading hopper and printed plates in the given process. The formula is

$$L = A_{head} + nA_{inter} + A_{end}$$

A_{head} - length of the head section; n - the number of intermediate sections; A_{inter} - length of one intermediate section; A_{end} - end section, in which the number of plates may be less than in an intermediate section but the length must be approximately the same. It is pointed out that lines built in sections can be used in mass and lot production. There are 4 figures.

Card 3/5

MOROZOV, A. I. Cand Phys-Math Sci -- (diss) "Concerning the electromagnetic reciprocal action of ~~operating cables~~ moving strips with current with a medium." Mos, 1957. 10 pp 22 cm. (Mos State Univ im M.V. Lomonosov). (KL, 25-57, 108).

PA - 2006

AUTHOR: MOROZOV,A.I.

TITLE: Interaction between a moving Wire through which an electric Current flows and a conductive Wall.

PERIODICAL: Zhurnal Eksperimental'noi i Teoret. Fiziki, 1956, Vol 31, Nr 6, pp 1079-1080 (U.S.S.R.)

Received: 1 / 1957 Reviewed: 3 / 1957

ABSTRACT: If a wire through which an electric current flows moves in the proximity of some medium, shifting and conduction currents are induced in this medium. The fields of these currents on their part act on the wire by attraction or repulsion. This is very similar to the phenomena occuring when a charge flies past a dielectricum. The present paper investigates the most simple case of such a phenomenon, i.e. when a straight wire, through which a current J flows, moves steadily and parallel ($v \ll c$) to the plane surface of a conductive medium. The following denotations are used in this case: l- distance between wire and conductor; σ, ε, μ - conductivity, complex dielectricity constant, and magnetic permeability of the medium; here it is true that $\varepsilon = \varepsilon_0 + i4\pi\sigma/\omega$ and the dispersion of ε_0, σ and μ is neglected.
The x-axis is here arranged along the current and the z-axis in the direction of the motion of the wire. The origin of coordinates is applied on the surface of the conductor. The expression for the components F_y and F_z of power are explicitly given. In this case the quantity $U_1 = c^2/4\pi\mu\sigma l$ is found to be equal to the critical velocity $v = c/n$ of ČERENKOV radiation. U_1 is here described as the first characteristic velocity and amounts, as in the case of copper, to $10^2/l$ cm/sec.

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Interaction between a moving Wire through which an electric Currents flows and a conductive Wall.

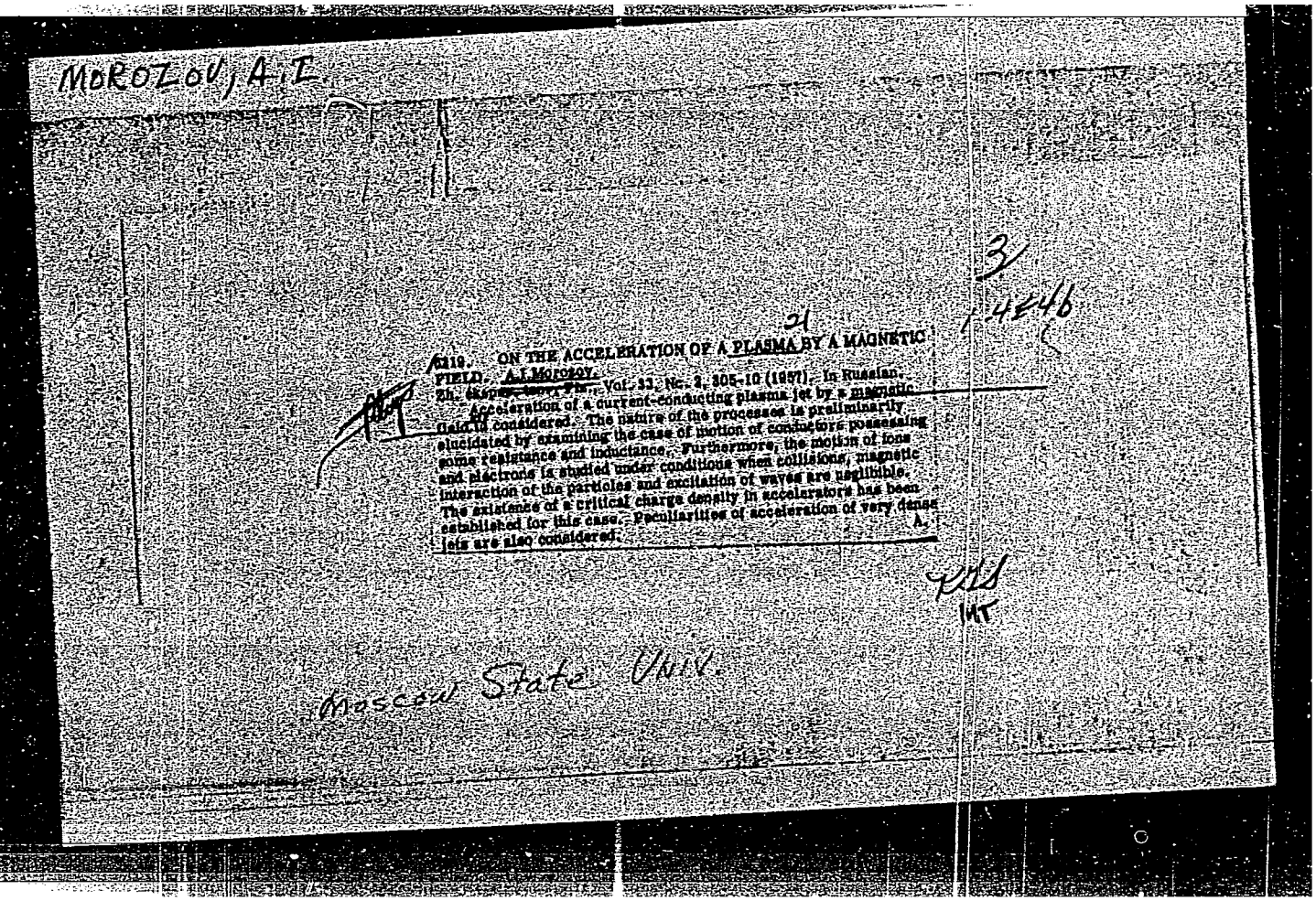
The force (F_z, F_y) is here computed for the two limiting cases $\mu=1$ and $\mu \gg 1$. On the condition $\varepsilon_0 \ll \pi^2 \sigma^2 l^2/c^2$ (which is actually always satisfied) the wire is repulsed by the wall at any velocity. F_z attains a maximum at $\nu = v/U_1$. This is based physically on the fact that with increasing v the ratio of ohmic and inductive resistance changes for the current induced in conductive walls (by the moving wire). The dependence of the component F_z on $\nu^{-1/2}$ is explained by the existence of a skin effect.
The other limiting case with $\mu \gg 1$ is the investigated. The case $v \ll U$ is of no special interest as long as U_1 is small. The main part is played here by the usual image forces which are proportional to $(\mu-1)/(\mu+1)$. Therefore $v \gg U$ is assumed in this case. The components F_z and F_y corresponding to this case are written down for the two limiting cases $U_1 \ll v \ll U_2$ and $v \gg U_2$. From the expressions mentioned here the following may be seen: In the case of $v \sim U_2$ the component Fy changes its sign, but F_z is transformed from an increasing function of velocity to a declining function.

ASSOCIATION: Moscow State University
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress
CARD 2 / 2

MOROZOV, A.I.

Interaction of a moving charged jet with the current and the magnetic dielectric. Vest.Mosk.un. 12 no.1:72-83 '57. (MLRA 10:8)

1.Moskovskiy universitet, Kafedra statisticheskoy fiziki i mekhaniki.
(Electromagnetic theory)



MOROZOV, A.I.

3
1-4246

21

6119. ON THE ACCELERATION OF A PLASMA BY A MAGNETIC FIELD. A.I. Morozov. Zh. eksper. teor. fiz., Vol. 33, No. 2, 305-10 (1957). In Russian.

Acceleration of a current-conducting plasma jet by a magnetic field is considered. The nature of the processes is preliminarily elucidated by examining the case of motion of conductors possessing some resistance and inductance. Furthermore, the motion of ions and electrons is studied under conditions when collisions, magnetic interaction of the particles and excitation of waves are negligible. The existence of a critical charge density in accelerators has been established for this case. Peculiarities of acceleration of very dense jets are also considered. A.

YHS
IMT

Moscow State Univ.

MIRCA-V 1.1.

56-5-53/55

AUTHOR MOROZOV, A.I.

TITLE On the Radiation of a Point Charge Moving Uniformly Along the Surface of an Isotropic Medium.
(Ob izluchenii tochechnogo zaryada, ravnomerno dvizhushchegosya vdol' poverkhnosti izotropnoy sredy-Russian)

PERIODICAL Zhurnal Eksperim.i Teoret.Fiziki,1957,Vol 32,Nr 5,pp 1260-1261(USSR)

ABSTRACT Different authors have investigated the motion of a charged particle along the plane surface of a dielectric.V.L.Ginzburg and I.M.Frank, Dokl.Akad.Nauk,Vol 56,p 699 (1947),investigated the phenomena taking place at the motion of a straight charged thread close to a medium with arbitrary ε' and μ'.In the paper under review,its author lists some of the corresponding results for a point charge.Using concepts of a nondiverging medium it is possible to obtain a clear quantitative picture.Under exactly the same conditions the paper under review lists a formula for the performance of the Cherenkov's radiation of a particle moving in vacuum in the distance l from the medium with the velocity $v=\beta c$.For purposes of comparison,the corresponding formula is given for the radiation performance of the unit of length of a charged thread.The following conclusions can be drawn from these formulae: a) In the relativistic case the radiation performance tends at $\theta=1-\beta^2$ independently from the properties /of the medium?/ towards the boundary value $P\rightarrow e^2c/2l^2$; $P_l=0$.In this context,P denotes the radiation performance of the punctiform particle,and P_l stands for the radiation performance per unit of length of the thread. b) In the

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On the Radiation of a Point Charge Moving Uniformly Along the Surface of an Isotropic Medium. 56-5-53/55

Nonrelativistic domain we have at the motion close to the dielectric under the condition $\beta\sqrt{\varepsilon'} \gg 1$; $P \sim \frac{e^2}{2l^2}\frac{c}{\sqrt{\varepsilon'}}\beta^2$; $P_1 = 2\frac{e^2}{l}\frac{\beta^2}{\sqrt{\varepsilon'}}$, β^2 From a point of view of physics, this result can be easily understood, because in the nonrelativistic case the field enters virtually normally into a dielectric with $\varepsilon' \gg 1$. c) The performance of the radiation into a magneticum ($\varepsilon' = 1$) amounts at $\beta^2\omega \gg 1$ and at nonrelativistic velocities to $P \sim e^2 c/2l^2\sqrt{\mu'}$; $P_1 \sim 2e^2 c/l\sqrt{\mu'}$. d) At the motion close to a medium of the ferrite type ($\mu' \gg \varepsilon' \gg 1$) we have at $\omega\beta^2 \gg \varepsilon'$ and at $\delta \sim 1$: $P \sim (e^2 c/2l^2)\sqrt{\varepsilon'/\mu'}$; $P_1 \sim (2e^2 c/l)\sqrt{\varepsilon'/\mu'}$. Finally the paper under reports on the forces acting on the particle at rigth angle to the surfade.
(No reproduction).

ASSOCIATION Moscow State University.
PRESENTED BY
SUBMITTED 18.2 1957
AVAILABLE Library of Congress.
Card 2/2

MOROZOV, A.I.

50-4-17/54

AUTHOR: Morozov , A.I.

TITLE: On the Use of the Boundary- Value Conditions According to Leontovich in the Theory of the Cherenkov Radiation. (O primenenii granichnykh usloviy Leontovicha v teorii Cherenkovskogo izlucheniya)

PERIODICAL: Zhurnal Eksperim. i Teoret.Fiziki, 1957, Vol. 33, Nr 4, pp. 933-939 (USSR)

ABSTRACT: With the aid of the approximate boundary value according to Leontovich the field of a charge which moves across a plane boundary is theoretically calculated. The Leontovich boundary value is:

$$\sqrt{\varepsilon'}\, E_t = \sqrt{\mu'}\, H_t$$

where ε' and μ' are the magnetic or dielectric conductance respectively of an isotropic medium, E_t and H_t the tangential components of E and H. The result of the calculation of the following examples is given: a) Field of a point-charge which moves uniformly in the distance h, parallel with the z-axis, in a non-dispersing medium. b) Calculation of the instantaneous current value of the Poynting vector in a dielectric cylinder ($\lambda_1 \ll 1, \lambda \gg 1$) with the racius a when a charged wire moves, in parallel with the axis of the cylinder. There are 5 Slavic references.

ASSOCIATION: Moscow State University. (Moskovskiy gosudarstvennyy universitet)

SUBMITTED: April 18, 1957

AVAILABLE: Library of Congress

Card 1/1

MOROZOV, A. I.

"Cherenkov Generation of Magneto-Acoustical Waves." (Work carried out in 1956); pp. 331-352.

"The Physics of Plasmas; Problems of Controlled Thermonuclear Reactions." Vol. IV. 1958, published by Inst. Atomic Energy, Acad. Sci. USSR.
resp. ed. M. A. Leontovich, editorial work V. I. Kogan.

Available in Library.

MOROZOV, A. I. and SOLOV'YEV, L. S.

"The Quenching of Vibrations of a Plasma Column." (Work carried out in 1958), pp. 391-414.

"The Physics of Plasmas; Problems of Controlled Thermonuclear Reactions." Vol. IV. 1958, published by Inst. Atomic Energy, Acad. Sci. USSR.
resp. ed. M. A. Leontovich, editorial work V. I. Kogan.

Available in Library.

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems in Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 343 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; I.M. Kirko, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Veltre, Candidate of Physics and Mathematics; V.G. Vitol, Candidate of Physics and Mathematics; Yu.M. Kruzin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magnetohydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 35 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and A.I. Gubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

Syrovatskiy, S.I. On the Stability of Shock Waves in Magnetohydrodynamics 127

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SOV/20-128-3-20/58

24(3)

AUTHORS: Morozov, A. I., Solov'yev, L. S.

TITLE: The Integrals of Drift Equations

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 3, pp 506-509 (USSR)

ABSTRACT: When the electromagnetic field slowly changes with respect to space and time, the travel of particles in it is defined by an approximate equation, i.e. by the drift equation. These equations are obtained by taking the mean (N. N. Bogolyubov, Yu. A. Mitropol'skiy, Refs 1, 2) of the fast revolution of the particles in the Larmor orbit. and they may be written down as the following equations for the center motion of the Larmor orbit (the principal center):

$$\frac{d\vec{r}}{dt} = v_{\parallel}\frac{\vec{H}}{H} + \frac{c}{H^2}\left[\vec{E}, \vec{H}\right] + \frac{mcv_{\parallel}^2}{eH^4}\left[\vec{H}(\vec{H}\nabla)\vec{H}\right] + \frac{mcv_{\perp}^2}{2eH^3}\left[\vec{H}, \nabla H\right]$$

$$\frac{d}{dt}(mc^2) = e\vec{E}\frac{d\vec{r}}{dt} + \frac{mv_{\perp}^2}{2H}\frac{\partial H}{\partial t}, \quad \frac{d}{dt}\left(\frac{m^2v_{\perp}^2}{H}\right) = 0, \quad v^2 = v_{\parallel}^2 + v_{\perp}^2, \quad m = \frac{m_0}{\sqrt{1-v^2/c^2}}$$

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$v_\parallel$ and $v_\perp$ denote the longitudinal and transverse component of the particle velocity with respect to the magnetic field $\vec{H}$. The time dependence of the unit vector $\vec{H}/H$ was also taken into account for the deduction of the above equations. The latter define the motion of the principal center along the line of force $\vec{H}$ at the velocity $v_\parallel \vec{H}/H$ as well as the drift across the lines of force of $\vec{H}$. For time-independent $\vec{E}$ and $\vec{H}$, the second and third equation of the above set may be represented in the form of the laws of conservation $mc^2 = e\Phi = E = \text{const}$ and $m^2 v_\perp^2 / m_o^2 H = J_\perp = \text{const}$. The following expression may thus be written down for the longitudinal velocity:

$v_\parallel = \sqrt{v^2 - J_\perp H \frac{m_o^2}{m^2}}$. For the drift equation in the constant fields $\bar{E}$ and $\bar{H}$, the relation $\operatorname{curl}\left(mv_\parallel \frac{\vec{H}}{H}\right) = mv_\parallel \operatorname{curl}\frac{\vec{H}}{H} + \left[\nabla(mv_\parallel)\frac{\vec{H}}{H}\right]$ results, which can also be written down in the form

$\frac{d\vec{r}}{dt} = \frac{\vec{H}}{H}\left\{v_\parallel - \frac{mc^2 v_\parallel^2}{eH}\left(\frac{\vec{H}}{H}\operatorname{curl}\frac{\vec{H}}{H}\right)\right\} + \frac{cv}{eH}\operatorname{curl}\left(mv_\parallel \frac{\vec{H}}{H}\right)$. In determining the integrals of the drift equations, the authors restricted

themselves to the case $(\vec{H}.\text{curl}\ \vec{H}) = 0$ if the second term in the above equation becomes equal to zero. The equation is thus reduced to the expression

$\frac{d\vec{r}}{dt} = \frac{v_{\parallel}}{H}\ \text{curl}\left(\vec{A} + \frac{mcv_{\parallel}}{eH}\vec{H}\right)$. The authors then introduce the vector potential $\vec{A}^* = \vec{A} + \frac{mcv_{\parallel}}{eH}\vec{H}$, and write the equation for the trajectories of the principal center in the Lagrangian form $\frac{d}{dt}\left(\frac{\partial L}{\partial \dot{q}_i}\right) = \frac{\partial L}{\partial q_i}$, where $L = \left(\frac{dr}{dt}\vec{A}^*\right)$ is assumed. By using this Lagrangian form, various integrals of motion may be obtained for the set of drift equations on the basis of the symmetry of this problem. Since drift equations are differential equations of second order, their integrals provide the equations of the trajectories. At $\vec{A}^* = \vec{A}$ the resultant formulas present the equations of the lines of force of the magnetic field $\vec{H} = \text{curl}\ \vec{A}$. At curl $\vec{H} \neq 0$, drift equations are difficult to solve even in the presence of certain symmetries. The article is concluded with an investigation of the motion of particles within the field of a circular current J which is

superimposed by the field of a straight wire with the current I. Finally, the authors thank Academician M. A. Leontovich and Academician L. A. Artsimovich for useful advice. There are 2 figures and 5 Soviet references.

PRESENTED: May 27, 1959, by M. A. Leontovich, Academician

SUBMITTED: May 5, 1959

9.3150, 24.2120, 10.7700

AUTHORS: Morozov, A. I., Solov'yev, L. S.

TITLE: Motion of Particles in a Crimped Toroidal Magnetic Field

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1960, Vol 30, No 3, pp 261-270 (USSR)

ABSTRACT: The authors investigated motion of charged particles inside a crimped toroidal magnetic field and showed for a sufficiently large radius of the toroid such a trap is absolute in drift equation approximation. They call a magnetic trap absolute when all particles coming from a region V_0 inside the trap, with velocities of arbitrary direction but of bounded modulus, remain inside a finite volume V_1, in the region of the trap. Such an absolute trap is represented by an uniform or crimped magnetic field, infinite in the Z direction. It is natural to try to

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Motion of Particles in a Crimped Toroidal Magnetic Field

77-37

Investigate stem fields when they are bent into a [illegible] of sufficiently large radius R. Since the adopted toroidal field does not possess symmetries, it is extremely difficult to use exact equations, and the authors limit themselves to the number of terms of the drift equations. Instead of starting from equations of drift, the authors start from the so-called longitudinal adiabatic invariant, [illegible] Rosenbluth and Longmire (see reference) and Kolomenskii (Plasma physics (Plasma Physics), Vol III, [illegible]).

$$J_{\parallel} = \int v_{\parallel} \, dl. \qquad (1)$$

Here $v_{\parallel}$ "longitudinal" velocity, [illegible] direction of the **H** lines, and the integral is [illegible] along **H** over a period of the field if the particle "flying through," [illegible], moving [illegible]

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9.3150, 24.2120, 1[illegible]

AUTHORS: Morozov, A. I., Solov'yev, L. S.

TITLE: Motion of Particles in a Screwed Toroidal Magnetic Field

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol 30, Nr 3, pp 271-282 (USSR)

ABSTRACT: The authors generalized the longitudinal invariant of the screwed field bent into a torus and used it to investigate the motion of particles in such a field. They started by a thorough exposition of the structure of the screwed field previously discussed in part by Spitzer, Johnson, et al. (see refs). The field with the screwed symmetry $H = H(r, \varphi - \alpha z)$ can be represented by means of a scalar potential:

$$\psi = H_0 z + \frac{1}{\alpha} \sum_{1}^{\infty} h_n f_n(r) \sin n\Theta, \quad \Theta = \varphi - \alpha z, \tag{1}$$

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MOROZOV, A.I.; SOLOV'YEV, L.S.

Movement of particles in a spiral toroidal magnetic field. Zhur. tekh.fiz. 30 no.3:271-282 Mr '60. (MIRA 14:8)
(Dynamics of a particle) (Magnetic fields)

84451

S/057/60/030/009/017/021
B019/B054

26.2331

AUTHORS: Morozov, A. I. and Solov'yev, L. S.

TITLE: The Acceleration of Plasma in the Coaxial

PERIODICAL: Zhurnal tekhnicheskoy fiziki, 1960, Vol. 30, No. 9, pp. 1104-1108

TEXT: In the first part of the present paper, the authors investigate the equilibrium of an accelerated plasma, assuming acceleration to occur in a coaxial device with an azimuthal magnetic field. The equation of equilibrium $-\nabla(p + H^2/8\pi) + (1/4\pi)(\vec{H}\nabla)\vec{H} + \rho\vec{a} = 0$ (1) is written down, and on the assumption of isothermal conditions the equation $2c_T^2\partial h/\partial z + a\partial/r\partial r\,(r^2 h) = 0$ (5) is obtained from (1) in cylindrical coordinates. Here, $h = H^2/8\pi$, and c_T is the sonic velocity in the plasma.

(5) has the general solution $h = (\Phi/r^2)(z - \frac{1}{a}2c_T^2 \ln r)$ (6). Further,

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the authors study the distribution of the field intensity in the given cylindrical device, and the distribution of the plasma density. In the second part of the paper, the authors investigate the stability of the plasma. In the introduction, they point out that all states studied in the first part of the paper are unstable. This statement is confirmed, and it is established that this instability has a certain similarity with the instability of a heavy liquid in a magnetic field. Further, it is shown here that this instability develops with the increment of the disturbance if the thickness of the transition region is small as compared with the wave length of the disturbances. If the thickness of the transition region is large as compared with the wave length of the disturbance, a convective instability occurs. In the third part of the paper, the authors investigate the role of finite resistivity and viscosity in the acceleration of a plasma cluster. In the first two parts, they assumed ideal conductivity and nonviscosity. Here, they obtain an expression for estimating the minimum wave length of the disturbance, and then investigate the interaction of the plasma with the walls of the coaxial device. As a close investigation is very difficult, the authors restrict themselves to a

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The Acceleration of Plasma in the Coaxial

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qualitative consideration. They obtain approximate expressions for the layer on the walls of the coaxial device, and find that this layer has small thickness if the particle concentration in the plasma cluster is higher than 10^{18} - 10^{19}. Finally, the authors thank Academician L. A. Artsimovich for his interest and advice. There are 4 figures and 3 Soviet references.

SUBMITTED: April 8, 1960

Card 3/3

S/124/62/000/009/004/026
A001/A101

AUTHORS: Dovzhik, S. A., Morozov, A. I.

TITLE: Experimental investigation of annular diffusers of axial turbomachines

PERIODICAL: Referativnyy zhurnal, Mekhanika, no. 9, 1962, 29, abstract 9B168 (In collection: "Prom. aerodinamika, no. 20", Moscow, Oborongiz, 1961, 168 - 201)

TEXT: The authors describe the results of an experimental investigation of aerodynamic characteristics of radial-annular and axial-annular diffusers having different geometrical parameters for two cases; uniform and nonuniform distribution of axial velocity along the radius at the inlet cross section. In the latter case, the annular diffuser was connected to the outlet section of the axial compressor. The authors obtained dependences of pressure loss coefficient and efficiency upon expansion angle, expansion degree, width of inlet section and radial dimensions. They established the dependence of diffuser effectiveness on the flow nonuniformity degree in the inlet section, and consequently, on the

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S/124/62/000/009/004/026
A001/A101

Experimental investigation of...

operational conditions of the compressor mounted before the diffuser. The results of the experimental investigation of small-size annular diffusers are presented for the case when their effectiveness is increased by mounting guidance surfaces in the section between the inlet and outlet.

A. S. Ginevskiy

[Abstracter's note: Complete translation]

Card 2/2

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26.2321

AUTHORS: [illegible] ...ov'yov, L. S.

TITLE: Magne[illegible]

PERIODICAL: Zhur[illegible]

TEXT: In connect[illegible] formula for magnetic equipotential surf[illegible] adapted to the [illegible] force is derived [illegible] the entire field $\vec{H}$ consists of a quasi[illegible] longitudinal part $\vec{H}^3$ and a relatively small perturbation $\vec{h}$. $\vec{h}$ is a periodic function of x_3, and its average over x_3 is zero; the coordinates x_3 coincide with the lines of force of the field $\vec{H}^3$. The formula reads $\bar{A}_3 - \frac{\sqrt{g}}{H_0^3}\,\overline{\hat{H}^1 H^1} = \text{const}$, where A_3 is the longitudinal, covariant component of the vector potential, H_0^3 is the constant part of the longitudinal field, and H^1 are the components of the "transverse" field, which are small compared with H^3. g is the [illegible]

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Magnetic surfaces

determinant of the coordinate system. The [illegible] the argument x_3. $H^1 = \bar{H}^1 + \hat{H}^1$ is a decomposition [illegible] "variable" part of H^1. A linear, a toroidal, and [illegible] the latter case, the magnetic surfaces can be expressed as [illegible] the mean angle of climb of the lines of [illegible] stellarator types of a linear field are calculated in the second part. In doing so, the authors restrict themselves to [illegible] particular, they calculate the effect of [illegible], perpendicular to the stellarator field, the [illegible] corrugated resonance field and a multiple [illegible] of force. In the general case, n-fold [illegible] was established for the first time by I. M. [illegible] XXXI, no. 10, p. 1164). Interesting configurations are [illegible] considering an irrotational magnetic field with [illegible] The authors also investigate a generalization [illegible] cases where $\vec{H} = \vec{H}(x_1, x_2, x_3, \varepsilon x_3)$ is a [illegible] function [illegible] εx_3, ε being a small parameter. This is illustrated by a rotating

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2768

Magnetic surfaces

If the field is [illegible] surfaces can be exactly determined in [illegible] ssed here (rosette, chains and [illegible] asma trapping. If the position of a [illegible] tion of the lines of force on it [illegible] etract the adjacent surfaces. At [illegible] surface, fields with translational symmetry $\vec{H} = \vec{H}(r,z)$, and helical symmetry $\vec{H} = \vec{H}(r,\theta)$ [illegible] $rH_z = \text{const}$, $wrH_\perp = \text{const}$, and $w\sqrt{1+\alpha^2 r^2}$. $H_\perp$ [illegible] the magnetic-field component on the [illegible] is perpendicular to z, to the φ-lines, and to the [illegible] $\theta = \varphi - \alpha z$ [illegible] respectively. I. M. Gel'fand, M. I. Grayev, [illegible] ntovich [illegible] ked for discussions. There are 10 figures and [illegible] references: 4 Soviet and 2 non-Soviet. The two references to English-language publications read as follows: Ref. 3: L. Spitzer, The stellarator program, report at the Second Geneva Conference 1958, Ref. 4: J. L. [illegible]neon et al., Second Geneva Conference 1958.

SUBMITTED: November [illegible], 1960

Card 3/3

28769

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S/[illegible]/61/031/010/002/015
B[illegible]/B[illegible]2

AUTHORS: Gel'fand, I. M., [illegible], S. M., Morozov, A. L, and Solov'yev, [illegible]

TITLE: Magnetic surfaces [illegible] twis[illegible] lical magnetic field perturb[illegible]

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. [illegible], no. 10, 1961, 1164 - [illegible]

TEXT: The authors investigated a magnetic [illegible] ribed in cylindric coordinates by the scalar potential $\psi = H_o z \cdot \frac{\ }{\alpha}$ [illegible] (3αr) sin $3(\varphi - \alpha z)$ [illegible] where H_o is a "longitudinal" homogeneous field, [illegible] is the amplitude of a helical magnetic field; I_3 is a modified th[illegible] order Bessel function; $\alpha = (2\pi)/L$; L is the pitch of the helix. This t[illegible] of field is of great interest for thermonuclear systems. The magnetic equipotential surfaces may be of two types: telescopic tubes or surfaces which do not enclose the axis of the system and are far away from it. The aim of this article was to give a general description of the effect of [illegible] corrugated [illegible]

Card 1/4

Magnetic surfaces of a triply twisted ...

i.e., a perturbation of the form $\psi_{corr} = \frac{h_0}{\kappa}$ ($\kappa\alpha r$) sin $\kappa\alpha$

magnetic surfaces at different h_0 and k. ... the total fi...
is not symmetric, magnetic surfaces can or... ...lated ...
The dependence of the angle of climb of the ... ...torce ...
characteristic radius must usually be inves... ...para...
are made for $\psi = z + h_3 I_3 (3r) \sin 3 (\varphi - \ldots I_0 (\kappa r$
and $\kappa = 3$, $h_3 = 3$ at different h_0. The inte... ...hich or...
for ... was considered, was taken as $0 \leq z \leq$ ... ...ani... ...
Int...gration was performed by the Runge-K... ...with the ...
$\frac{2\pi}{40}$, $\frac{2\pi}{80}$, and $\frac{2\pi}{160}$. In particular, the foll...wing ...s were ...
1) ... = 1, h_0 = 0.3 and ...e. The magnetic surfa... approach ...
wit... increasing h_0, and tubes not enclosing the z-axis are ...
h_0 ... 0.6. 2) k = 3, h_0 = 0.05, h_0 = ...1, and h_0 = ...125. ...
in... with the period $2\pi/3$ was found in these ...ases. For k = ...
the magnetic surfaces coincide with those obtained at k = ..., h_0 ...
Ca... 2/4

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S/057/61/031/010/002/015
B111/B112

Magnetic surfaces of a triply [illegible] ...

Inside the fully developed [illegible] there occurs a new surface with a three-leafed cross section. [illegible] deformation does not rotate but merely vibrates. The magnetic surfaces disappear under the action of strong perturbations, and the points [illegible] curves with helical cross sections (Fig. 9). The figures indicate the succession of the curve points. There are 10 figures and 5 Soviet [illegible] references.

SUBMITTED: November 17, 1960

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24705
S/056/61/040/005/018/019
B102/B201

26.2212
24.6750

AUTHORS: Morozov, A. I., Solov'yev, L. S.

TITLE: Kinetic consideration of some equilibrium plasma configurations

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 5, 1961, 1316 - 1324

TEXT: There is a number of plasma systems being of interest in practice, the properties of which cannot be described within the limits of magnetohydrodynamics. Such are, e.g., systems with acute-angled geometry, adiabatic traps with ion injection ("Ogra", "Astron"). Kinetic calculations of equilibrium configurations have been repeatedly performed for special cases. The authors of the present paper offer a kinetic treatmert of some concrete one-dimensional plasma configurations. In view of the fact that systems, in which the Larmor radius of both electrons and ions is small compared with the scale of inhomogeneity of the field, can be treated in terms of magnetohydrodynamics, the systems studied here have dimensions of the order of the Larmor radius of electrons or ions. Two limiting cases

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Kinetic consideration of some...

may be distinguished here: in one there is a region of transition of the order of the Larmor radius between the plasma without magnetic field and the magnetic field; in the other, the whole region occupied by the plasma is of the order of the Larmor radius ("Ogra", "Astron"). The authors restrict themselves here to one-dimensional problems, where all quantities are functions of only one coordinate (x), and the equilibrium configuration (neglecting collisions) is given by Vlasov's equations

$$v_x \frac{\partial f_e}{\partial x} - \frac{e}{m}\left(\mathbf{E} + \frac{1}{c}[\mathbf{vH}]\right)\frac{\partial f_e}{\partial \mathbf{v}} = 0, \qquad (1a, b)$$

$$v_x \frac{\partial f_i}{\partial x} + \frac{e}{M}\left(\mathbf{E} + \frac{1}{c}[\mathbf{vH}]\right)\frac{\partial f_i}{\partial \mathbf{v}} = 0;$$

$$\operatorname{div}\mathbf{E} = 4\pi e\int (f_i - f_e)\,d\mathbf{v}, \qquad \operatorname{rot}\mathbf{H} = \frac{4\pi e}{c}\int \mathbf{v}\,(f_i - f_e)\,d\mathbf{v},$$

$$\mathbf{E} = -\nabla\Phi, \qquad \mathbf{H} = \operatorname{rot}\mathbf{A}.$$

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Kinetic consideration of some...

If $H_x = 0$ one obtains

$$\frac{d^2\Phi}{dx^2} = -4\pi e \int (f_i(v, A, \Phi) - f_e(v, A, \Phi))\, dv,$$

$$\frac{d^2A}{dx^2} = -\frac{4\pi e}{c} \int v\,(f_i(v, A, \Phi) - f_e(v, A, \Phi))\, dv. \qquad (5)$$

or, in axial symmetry ($H_r = 0$)

$$\frac{1}{r}\frac{d}{dr} r \frac{d\Phi}{dr} = -4\pi e \int (f_i - f_e)\, dv.$$

$$\frac{d}{dr}\frac{1}{r}\frac{d}{dr} rA_\varphi = -\frac{4\pi e}{c} \int v_\varphi (f_i - f_e)\, dv, \qquad (11)$$

$$\frac{1}{r}\frac{d}{dr} r \frac{dA_z}{dr} = -\frac{4\pi e}{c} \int v_z (f_i - f_e)\, dv.$$

results. The solutions of (5) or (11) are obtained in considerably simpler way by taking the plasma to be quasineutral. The present study begins with

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Kinetic consideration of some...

plane "single-component" systems, i.e., such in which the current involves particles of only one kind, while the other kind serves for charge compensation only and displays a Boltzmann distribution ($n = n_0 \exp(-Ze\phi/T)$. The normal drop of a monoenergetic ion beam on a magnetic field is examined, and

$$\frac{d^2A}{dx^2} = \frac{4\pi e n_0}{c}\frac{eA}{Mc}\left[1-\frac{2e\Phi}{Mv_{0i}^2}-\left(\frac{eA}{Mc}\right)^2\frac{1}{v_{0i}^2}\right]^{-1/2},$$

$$\frac{d^2\Phi}{dx^2} = -4\pi e n_0\left\{\left[1-\frac{2e\Phi}{Mv_{0i}^2}-\left(\frac{eA}{Mc}\right)^2\frac{1}{v_{0i}^2}\right]^{-1/2}-e^{e\Phi/T}\right\}. \quad (13)$$

is obtained for the potentials (n_0 being the particle concentration in $x = -\infty$, T the electron temperature in energy units). This system of equations is rendered into

$$\frac{d^2a}{d\xi^2} = \frac{a}{\sqrt{1-\alpha\psi-a^2}}, \quad \frac{d^2\psi}{d\xi^2} = -\frac{Mc^2}{T}\left(\frac{1}{\sqrt{1-\alpha\psi-a^2}}-e^{\psi}\right).$$

Здесь

$$\psi = e\Phi/T, \quad a = eA/Mcv_{0i}, \quad \xi = x/D_{ic}, \quad \alpha = 2T/Mv_{0i}^2; \quad (16)$$
$$D_{ic} = c/\omega_{0i}, \quad \omega_{0i}^2 = 4\pi e^2 n_0/M.$$

Card 4/10

by introducing dimensionless parameters (this holds for x<0). For $Mc^2/T \gg 1$ and $\alpha \ll 1$ one obtains

$$\xi = \ln \left| \operatorname{tg} \frac{\chi}{4} \Big/ \operatorname{tg} \frac{\pi}{8} \right| + 2\left(\cos \frac{\chi}{2} - \cos \frac{\pi}{4}\right), \qquad \sin \chi = a. \tag{20}$$

which fits the result by Ferraro (J. Geophys. Res., 57, 15, 1952). The present study is then extended to a plasma screw (Fig. 3), in which the charge is compensated by cold neutrons. This system is described by equations $d^2a/d\xi^2 = a/\sqrt{1-a^2}$; $\nu = -\frac{1}{2}\ln(1-a^2)$ with the integral $\dot{a}^2 = h_1^2 + 2(1-\sqrt{1-a^2})$, where $h_1 = H_1 e D_{ic}/Mcv_{oi}$, H_1 being the field strength for x =0.

$$\xi = -4k^{-2}[E(k) - E(k, \pi/2 - \chi)] + 2(1 + 2/k^2)[K(k) - F(k, \pi/2 - \chi)]. \tag{22}$$

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Kinetic consideration of some...

is obtained here for the field change. Finally, the authors examine the interface between plasma and field for ions with a Maxwellian distribution in $x = -\infty$, where the charge is, in turn, compensated by cold electrons.

$$\xi = \sqrt{\frac{2}{\pi}} \int_0^a dx \left[1 - \frac{4}{\pi} \int_0^\infty \exp\left(-x^2 (1+\xi^2)^2/4\right) d\xi / (1+\xi^2)^2 \right]^{-1/2}. \qquad (29)$$

is obtained here. The motion in an axially symmetric field is studied in the following section. A plasma column of monochromatic ions and cold electrons (with Maxwellian distribution) is here considered first ($H_z \neq 0$, all other quantities depend on r only). For $v_{iz} = 0$ the ion trajectories of this system are as shown in Fig. 6a or 6b, depending on whether the Larmor radius is larger or smaller than the column radius. Instead of (11) one has

$$\frac{d}{dr}\left(\frac{1}{r}\frac{d}{dr} r A_\varphi\right) = -\frac{4\pi Q}{cr}\left(\frac{P}{Mr} - \frac{eA_\varphi}{Mc}\right)\left[v_0^2 - \left(\frac{P}{Mr} - \frac{eA_\varphi}{Mc}\right)^2\right]^{-1/2}. \qquad (32)$$

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